Behind the head, the segments for free motion cannot be moved by the developing segmental muscles until an intercalary segmentation has taken place; hence the vertebral segments which come between the "muscle-plates" and spinal nerves.

The head, eschewing such mobility, has developed an axial box for the brain, and beneath this firm structure, the mobile and distensible mouth and throat are swung.

III. "On an Extension of the Phenomena discovered by Dr. Kerr and described by him under the title of 'A New Relation between Electricity and Light.'" By J. E. H. Gordon, B.A., Assistant Sec. of the British Association. Communicated by Professor Tyndall, F.R.S. Received February 10, 1879.

In November, 1875, Dr. Kerr announced in the "Philosophical Magazine," that he had discovered a new relation between electricity and light. He showed that when glass is subjected to an intense electrostatic stress, that a strain is produced which causes the glass to act like a crystal upon polarized light.

On Wednesday, February 5, 1879, I was working at this experiment in the Royal Institution, and endeavouring, by means of the electric light, to project the effect on a screen, in preparation for a lecture on the next day.

In the experiment as described by Dr. Kerr, and which was shown plainly on the screen, on February 6, the light is extinguished by the Nicols, and reappears when the coil is set going.

In the projection experiment a patch of moderately bright white light, about 3 inches diameter, appeared on the screen when the coil was worked. The images of the points inside the glass were about $1\frac{1}{2}$ inches apart. On Wednesday, however, the electrostatic stress was accidentally allowed to become strong enough to perforate the glass. Immediately before perforation there occurred the effects which are the subject of the present communication.

First appeared a patch of orange-brown light about 6 or 7 inches diameter. This at once resolved itself into a series of four or five irregular concentric rings dark and orange-brown, the outer one being perhaps 14 inches diameter. In about two seconds more these vanished and were succeeded by a huge black cross about 3 feet across, seen on a faintly luminous ground. The arms of the cross were along the planes of polarization, and therefore (the experiment being arranged according to Dr. Kerr's directions) were at 45° to the line of stress.

The glass then gave way, and all the phenomena disappeared except the extreme ends of the cross, and the discharge through the hole, where the glass had been perforated, was alone seen.

The phenomena were seen by Mr. Cottrell, by Mr. Valter (the second assistant), and by myself. A fresh glass plate was at once drilled in hopes of repeating the phenomena in the lecture next day, but owing to sparks springing round we did not succeed in perforating the glass, and therefore saw only the faint return of light described by Dr. Kerr.

Some more glasses have been prepared and their terminals insulated, and I now propose to make another attempt to repeat the new effects before the Royal Society.

February 20, 1879.

THE PRESIDENT in the Chair.

The Presents received were laid on the table, and thanks ordered for them.

The following Papers were read:—

I. "On Electrical Insulation in High Vacua." By WILLIAM CROOKES, F.R.S. Received February 6, 1879.

The experiments here described were tried nearly two years ago. They were suggested by some observations I was then making on the passage of an induction current through highly exhausted tubes. The main branch of the research being likely to occupy my attention for some time, I may be unable to return to these less important offshoots. I have ventured, therefore, to embody them in a short note for the "Proceedings of the Royal Society."

A pair of gold leaves were mounted, as for an electroscope, in a bulb blown from English lead glass tubing. The leaves were attached to a glass stem and the lower part of the bulb was drawn out for sealing to a Sprengel pump as shown at fig. 1. A stick of ebonite excited by friction was generally used as the source of electricity, but any other source will do equally well, provided it is not too powerful.

No special attention was paid to the action of electricity on the leaves in air or at moderate vacua, as it agreed with what is already well known. The exhaustion was pushed to a very high degree (about the millionth of an atmosphere), when it was found that the excited